

Potentiometric Surface Map of the Unconsolidated Aquifers of Tippecanoe County, Indiana

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Tippecanoe County is located in the northwest section of Indiana and is bounded by the counties of Benton, White, Carroll, Clinton, Montgomery, Fountain, and Warren. The majority of the central and western portion of the county is situated within the Middle Wabash River Basin, with the remaining areas to the east, and a small section in the northwest, located in the Upper Wabash River Basin.

The potentiometric surface is a measure of the pressure on groundwater in a water bearing formation. Wells are completed in aquifers at various depths, and typically, under confined conditions (bounded by impermeable layers above and below the water bearing formation). However, some wells are completed under unconfined (not bounded by impermeable layers) settings. Water in a confined aquifer, which is under hydrostatic pressure, will rise in a well above the top of the water bearing formation in contrast to groundwater in an unconfined aquifer, which is at atmospheric pressure and will not rise in a well above the top of the water bearing formation.

Static water-level measurements obtained from individual wells used to construct county Potentiometric Surface Maps (PSM) are indicative of the water-level at the time of well completion. The groundwater level within an aquifer constantly fluctuates in response to rainfall, evapotranspiration, groundwater movement and pumpage. Therefore, measured static water-levels in an area may differ due to local or seasonal variations. Because fluctuations in groundwater are typically small, static water-levels can be used to construct a generalized PSM. As a general rule, but certainly not always, groundwater flow approximates the overlying topography and intersects the land surface at major streams.

The potentiometric surface map of the unconsolidated aquifers was mapped by contouring the elevations of 2549 static water-levels reported on well records received primarily over a 50 year period. Universal Transverse Mercator (UTM) coordinates, used in locating the water wells, were either physically obtained in the field, determined through address geocoding, or reported on water well records. The location of the majority of the water well records used to make the PSM were field verified. Elevation data were obtained from a digital elevation model. Quality control/quality assurance procedures were utilized to refine or remove data where errors were readily apparent.

The mapped potentiometric surface contours are primarily for the upper 100 feet of the unconsolidated materials and utilize data for wells 100 feet or less in depth. If the shallow data was sparse or unavailable in an area, wells greater than 100 feet in depth were used to complement the mapping. A deep buried bedrock valley, the Lafayette (Teays) Bedrock Valley System, covers nearly 40 percent of the county and is overlain by unconsolidated deposits up to 300 feet thick in places. Wells completed in these areas are often deeper and utilized almost exclusively in the mapping of the PSM surface.

Potentiometric surface elevations range from a high of 810 feet mean sea level (msl) in the southeast portion of the county, to a low of 500 feet msl in the west-central section.

Groundwater flow direction within the majority of the county is generally towards the Wabash River and its major tributaries. Potentiometric contours are not extended through areas of the county where data is lacking and/or unconsolidated deposits are thin or unproductive.

The county PSM can be used to define the regional groundwater flow path and to identify significant areas of groundwater recharge and discharge. County PSM's represent overall regional characteristics and are not intended to be a substitute for site-specific studies.